

### **REMARKS**

Upon entry of the present amendment, claims 1-6 and 8 are present in the case. Applicant has amended claims 1-3. Claims 4-6 have been previously presented and are not amended herein. Claim 8 is new and claim 7 has been canceled. In view of the foregoing amendments and the present remarks, applicant requests entry of the present Amendment, reconsideration of the rejections and objections of the pending office action and withdrawal of the same, and allowance of all claims present in the case at an early date.

#### **REJECTION OF CLAIMS 1-6 UNDER U.S.C. § 103(a)**

Applicant respectfully traverses all of the rejections of claims 1-6, as currently amended, under 35 U.S.C. § 103(a) and submits the following argument in support of allowance of said claims.

Applicant respectfully submits that neither the Schofield et al. reference (U.S. Patent No. 5,163,692), nor the Iverson reference (U.S. Patent No. 4,685,685), nor any combination thereof, disclose, teach, suggest, nor make obvious at the time the invention was made to a person having ordinary skill in the art, a U-shaped, circular seal body having an open, U-shaped channel with a plurality of tangentially positioned ribs located within the channel, wherein said seal further includes a composite wear surface on an inner diameter wall of the seal body, an inner diameter dynamic seal and an outer diameter static seal, a first lip profile being affixed to an upper end of the inner diameter dynamic seal and a second lip profile being affixed to an upper end of the outer diameter static seal.

The Schofield reference is greatly distinguishable from the present claimed invention in that Schofield teaches and requires a V-shaped body 12, having a V-shaped cavity 28, wherein the flat pair of OD and ID walls 20, 22 are required to converge (Schofield, Figs. 1-4, col. 5, lines 4-6) such that the opposite faces of the cavity 28 are required to taper toward one another at approximately the same “an angle of taper” (Schofield, col. 5, lines 33-36). There is no such “taper” requirement or limitation in the present invention, and in fact, the description and drawings of the U-shaped seal body and U-shaped, open channel of the present invention show and specifically teach away from the Schofield reference. The “U-shape” body of the present invention eliminates the need for using additional mating components to create the seal. As shown in Schofield, Figs. 8 and 9 and discussed in col. 10, lines 10-13, the use of a V-shaped seal body in Schofield requires that a plastic insert back-up ring 64, 74, be molded and bonded to the elastomer to form a one-piece seal. The present invention effectively creates a seal using it’s “U-shaped” body without the need for a back-up ring or other mating components. Thus, Schofield’s V-shaped body could not be substituted for the present invention “U-shaped” power end seal. A further advantage that the “U-shaped” body of the present invention has over the Schofield V-shaped body, is that a “U-shaped” body is better designed to combat deflection, as compared to a V-shaped body. This is one reason that the Schofield V-shaped seal body requires the back-up ring 64, 74.

The present invention power end seal is further distinguished from the Schofield reference in that the present invention requires, teaches and claims a U-shaped circular body and a U-shaped open channel, wherein the outer

diameter wall and inner diameter wall are not flat as described in Schofield, but rather include a first lip profile and a second lip profile. The Schofield reference does not include or teach the use of lip profiles. The Schofield reference is further distinguished from the present invention power end seal, in that Schofield specifically requires the use of a metallic, ring-shaped, finger spring energizer generally having an inverted, U-shaped cross section (Schofield, col. 5, lines 53-68 and col. 6, lines 1-26) wherein the OD and ID legs of the spring are bonded within the OD and ID lips of the seal. The present invention power end seal has no such requirement or limitation.

With regard to the present invention's use of an inner composite wear surface comprised of aramid fiber filled rubber, the applicant disputes the Examiner's assertion that such use would have been obvious for one of ordinary skill in the art at the time the invention was made to make the composite wear surface from aramid fiber filled HNBR rubber. Further, the Examiner has submitted no prior art to support such an assertion. In considering this rejection, Applicant first notes the requirements for making such a rejection. The examiner has the burden of presenting a *prima facie* case of unpatentability, which requires the examiner to produce a factual basis for rejection of the claims under 35 USC § 103. If that burden is met, then the burden of going forward with evidence shifts to the applicant. See, e.g., In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785 (Fed. Cir. 1984); In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). "If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent." In re Oetiker, *supra* at USPQ2d 1444; *see also* In re Rouffet, 149 F.3d 1350, 47 USPQ2d 1453, 1455 (Fed. Cir. 1998).

As correctly pointed out by the Examiner, the Schofield reference does not teach, suggest or include the use of a plurality of ribs tangentially positioned within the U-shaped channel to provide flexible tension, as required in the present invention.

Applicant strongly disagrees with the Examiner's assertion that the plurality of braces described in the Iverson reference, are an improvement over Schofield's metallic, ring shaped, finger spring. The Iverson reference, which was filed in December 1986, more than four years prior to the filing of the Schofield reference, describes a plurality of braces as being an improvement over the prior art "expander rings" which have been formed of "elastomeric materials" (Iverson, col. 1, lines 32-50). Elastomers are defined as "any of various elastic substances resembling rubber" (*See*, Webster's Ninth New Collegiate Dictionary, 1984). Elastomers do not include metal substances. The expander rings formed of "elastomers," as discussed in Iverson, are not described as being comprised of metal or a metallic spring, unlike the required metallic, finger spring in the Schofield reference. Hence, there has been no showing that "elastomers" include metal or metallic springs. The Schofield reference, which specifically requires the use of a metallic, ring-shaped, finger spring, was filed in July 1991, more than 4 years after the filing date of Iverson. The earlier filed Iverson reference could not be an improvement over the Schofield device, since Iverson does not specifically discuss or describe prior art elastomer expander rings to include a "metallic spring" as required in the Schofield reference and "elastomers" have not been otherwise shown to include metallic springs. It is believed that the elastomer expander rings discussed in the Iverson reference include rubber-type o-rings. Neither the Schofield

device, nor the present invention, include, teach or require elastomer expander rings. Therefore, the Examiner's assertion that it would have been obvious for one of ordinary skill in the art at the time the present invention was made to use the "ribs" taught by Iverson to improve the seal and accommodate large expansion/compression ranges is completely without merit.

As previously discussed, the Iverson reference teaches and requires numerous features which are not required, taught, disclosed or claimed in the present invention, including but not limited to a deformable, annular seal ring requiring the features of a double-apex (Iverson, col. 1, lines 62-63), Y-shaped cross-section (Iverson, col. 1, line 47) having a V-shaped annular groove (Iverson, col. 2, line 43), inclined bottom surfaces in the V-shaped groove and a solid base/stem (Iverson, col. 1, line 47) for use in sealing the annular area between a piston and a curved wall surface of a cylinder bore (Iverson, col. 3, lines 13-14). Applicant strongly objects to the examiner's assertion that the Iverson reference discloses a "u-shaped body." On the contrary, the Iverson device discloses a Y-shaped body, having a V-shaped annular groove in combination with a solid stem/base. Unlike the seal in Iverson, the present invention power end seal is designed for use in a packing gland of a gear box to seal the radial surface of a connecting or extension rod, not the annular area between a piston and a cylinder wall surface. Further, the present invention power end seal does not require, teach or suggest the features of a seal having a double-apex, Y-shaped cross-section, a V-shaped annular groove, inclined bottom surfaces in the V-shaped groove, or a solid base/stem. Further, the Iverson annular seal ring is required to attach to the piston head and move (reciprocate) in association

with the stroking movement of the piston in working combination within the cylinder bore, to effectively seal the annular area “between a piston and a curved wall of a cylinder” (Iverson, col. 3, lines 13-14). Unlike the Iverson device, the present invention power end seal is stationary and contained within a packing gland and does not reciprocate or move in association with the stroking or reciprocating movement of the connecting rod. The application for sealing between a piston and a curved cylinder wall surface requires that the seal be deformable (Iverson, col. 2, line 65) and allow for substantial variation in size in one dimension (Iverson, col. 2, lines 1-2). Moreover, Iverson does not teach, suggest or require the use of composite materials to construct its Y-shaped seal, but rather teaches the construction of its seal using a single type of material, i.e., rubber, neoprene, urethane, (Iverson, col. 2, lines 64-68), with no apparent need to offset the effects of deflection, minimizing radial squeeze, reducing heat build up and reducing seal wear, as does the present invention. As pointed out by the Examiner, the Iverson reference does not use, suggest or teach a seal having a composite wear surface to engage and seal a moving machine part, as expressly required and taught in the present invention.

The present invention power end seal, as stated above, does not require, teach or suggest the necessary features of a seal having a double-apex, Y-shaped cross-section, which includes a V-shaped annular groove, inclined bottom surfaces in the V-shaped groove and a solid base/stem, as required in the Iverson reference. The power end seal of the present invention, is used to seal the radial surface of connecting or extension rods used in the gear box of reciprocating pumps, is not interchangeable with a seal used in an annular area between a piston and a cylinder wall surface.

Unlike the Iverson seal, the present invention power end seal is stationary and fits within a packing gland of a gear box to maintain a constant seal around a connecting or extension rod as the rod reciprocates back and forth within the inner diameter wall, and in contact with the composite wear surface of the seal, while maintaining sealing contact between the connecting rod and the inner diameter wall surface of the power end seal. Unlike the Iverson reference, the present invention power end seal claims, teaches and requires a U-shaped, circular seal body, having an open, U-shaped channel, an inner diameter wall and an outer diameter wall, wherein the inner diameter wall includes a composite wear surface to withstand a large amount of deflection from connecting rod misalignment, while minimizing radial squeeze around the rod surface and reducing heat build up and seal wear, typically caused by rod misalignment. While the Iverson seal is constructed of a single elastomeric material to provide for substantial variation and deformation to seal an annular area between a piston and a cylinder wall surface, the present invention power end seal is constructed of a plastic or elastomer filled composite material, i.e., PTFE, bronze filled PTFE, carbon filled PTFE or aramid fiber filled HNBR, which are materials designed to withstand deflection and heat buildup caused by misalignment of the connecting rods, while minimizing seal wear. Further, the present invention power end seal is asymmetrical in shape wherein the inner diameter wall is shorter in height as compared to the outer diameter wall, as required by the configuration of the packing gland of a gear box. The Iverson seal is symmetrical in shape. The present invention power end seal does not require a double apex configuration as does the seal in the Iverson reference (col. 1, lines 62-63). The U-shaped, circular seal body of the

present invention power end seal does not require, teach or suggest the inclusion of a solid stem or base as required in the Iverson reference (Iverson, col. 1, line 47). Moreover, the solid stem or base, required in the Iverson seal, used in combination with the Y-shaped cross-section, could not fit in the packing gland of a gear box, and more importantly, could not withstand the deflection caused by the connecting rod, nor prevent against excessive wear and heat buildup, unlike the present invention. The Iverson seal is not intended, nor able to, combat the deflection created by misalignment of the connecting and extension rods, whereas the present invention power end seal is designed to combat this type of deflection. Additionally, the V-shaped annular groove of the Iverson reference teaches away from the U-shaped channel of the present invention, wherein the V-shaped groove of the Y-shaped cross-section requires the use of various inclined bottom surfaces to provide the required lateral flexibility to the seal (Iverson, col. 2, lines 43-51). The present invention power end seal does not teach, suggest or require the use of any inclined or slanted, inner bottom surfaces, as required by the V-groove of the Iverson seal.

In summation, it is clear that claims 1-6, as currently amended, and new claim 8 are in no way obvious under 35 U.S.C. 103(a) as being unpatentable over Schofield et al. (5,163,692) in view of Iverson (4,685,684). Accordingly, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 1-6, as currently amended, and new claim 8.

#### OTHER ART CITED

Additionally, the Examiner has cited Frank Bastow U.S. Patent No. 3,271,038; Gorman U.S. Patent No. 5,377,999; Couvillion et al. U.S. Patent



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No. 4,411,439; and Wheeler U.S. Patent No. 4,526,385 as prior art made of record and not relied upon, but considered pertinent to Applicant's disclosure. Applicant appreciates the Examiner bring these references to his attention and has reviewed these references. Applicant asserts that these references taken alone or in combination with any of the other cited references, do not foreclose the patentability of the present invention.

#### PETITION FOR EXTENSION OF TIME

Applicant herein petitions for an extension of time beyond the shortened statutory period for response of three months in the Office Action dated September 16, 2005. Enclosed herewith is a completed form PTO/SB/22 and the extension fee of \$60.00 for response within the first month after the shortened statutory period. The Applicant qualifies as a small business entity under 37 C.F.R. §1.9(f) and evidence of such has been previously filed

#### SUMMARY

Because the total number of claims and the number of independent claims for which a filing fee has been paid are not exceeded by the entry of this Amendment, no fee for additional claims is due.

In view of the foregoing, it is respectfully submitted that currently amended claims 1-3 and previously presented claims 4-6, and new claim 8 are allowable. It is believed that this case is now in condition for allowance and such action is respectfully requested.

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Respectfully submitted,

A handwritten signature in cursive script, reading "David M. O'Brian", written over a horizontal line.

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